## SEQUENCE LISTING

<110> Messier, Walter <120> Methods to Identify Evolutionarily Significant Changes in Polynucleotide and Polypeptide Sequences in Domesticated Plants <130> GENO200.1/CIP <150> US 09/240,915 <151> 1999-01-29 <150> US 60/349,088 <151> 2002-01-16 <150> US 09/368,810 <151> 1999-08-03 <150> US 09/875,666 <151> 2001-06-06 <150> US 60/315,595 <151> 2001-08-29 <160> 91 <170> PatentIn version 3.1 <210> <211> 2441 <212> DNA <213> Oryza sativa cv. Azucena <400> 1 ccatgtcgag gtgcttcccc tacccgccgc cggggtacgt gcgaaaccca gtggtggccg 60 tggccgcggc cgaagcgcag gcgaccacta aggtttgttg aaccatcgga tttacacacg 120 cacgtgccgg atcatttgct cttgcctgtt ggttttgatc ggatctgttg gttgtgcgtg 180 tgtgatttgg ggatcgcacg tgcggggaag ctaacctttg catggataac ttgagatttg 240 tgaggccgcg cttcgaccag atcggtcgcc aatcttttag tggctgaccg tggaaagagg 300 atattactga ccttcggttt gctaattttg gttgtgccgt tgaatctgaa ataaccagaa 360 tagtcatggg gaaaaaagtc tgatctggaa ggttcgaatt acatttctat atattgttgt 420 gctcccagac gatggttgca agaaatcact catgctggat aaaattgtgg atgtaagagt 480 ctgcagtcgt taaaatctgg aaacagcaca ttttgccgta gtaaatttga atccatgttg 540 ctgtctcgtt attggtgtgt tacgagtaac ctgtgtgttg ttatctccgc ttggactaga

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Leu Ser Glu Glu His Gly Ala Pro Cys Phe Thr Gln Thr Glu His Gly
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Ser Pro Glu Ser Ser Gln Asp Ser Ser Lys Arg Arg Lys Val Val Leu 115 120 125

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Glu Met Leu Ala Asn Val Gly Pro Ser Pro Ser Lys Ala Lys Gln Ile 245 250 255

Val Asn Pro Ala Ala Ala Lys Val Thr Gln Arg Val Asp Pro Pro Pro 260 265 270

Ala Lys Ala Ser Gln Arg Ile Asp Pro Leu Leu Pro Ser Lys Val His 275 280 285

Ile Asp Ala Thr Arg Ser Phe Thr Lys Val Ser Gln Thr Glu Ile Lys 290 295 300

Pro Glu Val Gln Pro Pro Ile Leu Lys Val Pro Val Ala Met Pro Thr 305 310 315 320

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- Pro Ser Pro Ser Gln Ala Lys Asn Gly Asn Ile Leu Arg Ile Lys Ile 130 135 140
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- Val Gln Thr Pro Val His Gln Met Gly Ser Val Ser Ser Leu Pro Ser 165 170 175
- Lys Lys Asn Ser Met Gln Pro His Asn Thr Glu Met Met Val Arg Thr 180 185 190
- Ala Ser Thr Gln Gln Gln Ser Ile Lys Gly Asp Phe Gln Ala Val Pro 195 200 205
- Lys Gln Gly Met Pro Thr Pro Ala Lys Val Met Pro Arg Val Asp Val 210 215 220
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- Glu Met Leu Ala Asn Val Gly Pro Ser Pro Ser Lys Ala Lys Gln Ile 245 250 255
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- Ala Lys Ala Ser Gln Arg Ile Asp Pro Leu Leu Pro Ser Lys Val His 275 280 285
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Lys Lys Arg Lys His Glu Asp Ile Asn Asn Ala Asp Gln Lys Ser Arg 65 70 75 80

Lys Val Ser Ser Met Glu Pro Gly Glu Gln Leu Glu Lys Ser Gly Leu 85 90 95

Ser Glu Glu His Gly Ala Pro Cys Phe Thr Gln Thr Val His Gly Ser 100 105 110

Pro Glu Ser Ser Gln Asp Ser Ser Lys Arg Arg Lys Val Val Leu Pro 115 120 125

Ser Pro Ser Gln Ala Lys Asn Gly Asn Ile Leu Arg Ile Lys Ile Arg 130 135 140

Arg Asp Gln Asp Ser Ser Ala Ser Leu Ser Glu Lys Ser Asn Val Val

The first first first

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Gln Gly Met Pro Thr Pro Ala Lys Val Met Pro Arg Val Asp Val Pro 210 215 220

Pro Ser Met Arg Ala Ser Lys Glu Arg Val Gly Leu Arg Pro Ala Glu 225 230 235 240

Met Leu Ala Asn Val Gly Pro Ser Pro Ser Lys Ala Lys Gln Ile Val 245 250 255

Asn Pro Ala Ala Ala Lys Val Thr Gln Arg Val Asp Pro Pro Pro Ala 260 265 270

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Glu Val Gln Pro Pro Ile Pro Lys Val Pro Val Ala Met Pro Thr Ile 305 310 315 320

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Ser Gly Arg Asn Ala Glu Ala Ala Ser Val Ser Val Glu Lys Gln Ser 340 345 350

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cct gat gct ggc att ggc aac tgc aga gaa att gtt gat cca ctt act
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Pro Asp Ala Gly Ile Gly Asn Cys Arg Glu Ile Val Asp Pro Leu Thr
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tct caa tca gca gag cag ttc tca ttg cag cct agg gcg att cat tta
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Ser Gln Ser Ala Glu Gln Phe Ser Leu Gln Pro Arg Ala Ile His Leu
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cca gac ctt cat gtc tat cag ttg cca tat gtg gtt cca ttc tag
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- Lys Ala Leu Pro His Gly Glu Ile Ser Lys His Ser Lys Arg Thr His 50 55 60
- Lys Lys Arg Lys His Glu Asp Ile Asn Asn Ala Asp Gln Lys Ser Arg 65 70 75 80
- Lys Val Ser Ser Met Glu Pro Gly Glu Gln Leu Glu Lys Ser Gly Leu 85 90 95
- Ser Glu Glu His Gly Ala Pro Cys Phe Thr Gln Thr Val His Gly Ser 100 105 110
- Pro Glu Ser Ser Gln Asp Ser Ser Lys Arg Arg Lys Val Val Leu Pro 115 120 125
- Ser Pro Ser Gln Ala Lys Asn Gly Asn Ile Leu Arg Ile Lys Ile Arg 130 135 140
- Arg Asp Gln Asp Ser Ser Ala Ser Leu Ser Glu Lys Ser Asn Val Val 145 150 155 160
- Gln Thr Pro Val His Gln Met Gly Ser Val Ser Ser Leu Pro Ser Lys 165 170 175
- Lys Asn Ser Met Gln Pro His Asn Thr Glu Met Met Val Arg Thr Ala 180 185 190
- Ser Thr Gln Gln Gln Ser Ile Lys Gly Asp Phe Gln Ala Val Leu Lys 195 200 205
- Gln Gly Met Pro Thr Pro Ala Lys Val Met Pro Arg Val Asp Val Pro 210 215 220
- Pro Ser Met Arg Ala Ser Lys Glu Arg Val Gly Leu Arg Pro Ala Glu 225 230 235 240

Met Leu Ala Asn Val Gly Pro Ser Pro Ser Lys Ala Lys Gln Ile Val 245 250 255

Asn Pro Ala Ala Ala Lys Val Thr Gln Arg Val Asp Pro Pro Pro Ala 260 265 270

Lys Ala Ser Gln Arg Ile Asp Pro Leu Leu Pro Ser Lys Val His Ile 275 280 285

Asp Ala Thr Arg Ser Phe Thr Lys Xaa Ser Gln Thr Glu Ile Lys Pro 290 295 300

Glu Val Gln Pro Pro Ile Pro Lys Val Pro Val Ala Met Pro Thr Ile 305 310 315 320

Asn Arg Gln Xaa Ile Asp Thr Ser Gln Pro Lys Glu Glu Pro Cys Ser 325 330 335

Ser Gly Arg Asn Ala Glu Ala Ala Ser Val Ser Val Glu Lys Gln Ser 340 345 350

Lys Ser Asp Arg Lys Lys Ser Arg Lys Ala Glu Lys Lys Glu Lys Lys 355 360 365

Phe Lys Asp Leu Phe Val Thr Trp Asp Pro Pro Ser Met Glu Met Asp 370 375 380

Asp Met Asp Leu Gly Asp Gln Asp Trp Leu Leu Gly Ser Thr Arg Lys 385 390 395 400

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Val Val Ala Val Ala Ala Glu Ala Gln Ala Thr Thr Lys Leu Gln
aaa gaa agg gaa aag gcc gaa aag aag aaa gag aaa agg agt gac agg
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Lys Glu Arg Glu Lys Ala Glu Lys Lys Glu Lys Arg Ser Asp Arg
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aag Lys	gtt Val	tcc Ser	tcc Ser	atg Met 85	gaa Glu	cct Pro	ggt Gly	gag Glu	caa Gln 90	ttg Leu	gag Glu	aag Lys	agt Ser	gga Gly 95	ctc	288
tca Ser	gaa Glu	gag Glu	cat His 100	Gly	gct Ala	cct Pro	tgc Cys	ttt Phe 105	act Thr	cag Gln	aca Thr	gtg Val	cat His 110	Gly	tct Ser	336
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Hall In the fact	gat Asp 385	atg Met	gat Asp	ctt Leu	ggg ggg	gac Asp 390	cag Gln	gat Asp	tgg Trp	ctg Leu	ctt Leu 395	ggt Gly	agt Ser	acg Thr	agg Arg	aaa Lys 400	1200
House Street	cct Pro	gat Asp	gct Ala	ggc Gly	att Ile 405	ggc Gly	aac Asn	tgc Cys	aga Arg	gaa Glu 410	att Ile	gtt Val	gat Asp	cca Pro	ctt Leu 415	act Thr	1248
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Lys Ala Leu Pro His Gly Glu Ile Ser Lys His Ser Lys Arg Thr His
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Lys Lys Arg Lys His Glu Asp Ile Asn Asn Ala Asp Gln Lys Ser Arg
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Arg Asp Gln Asp Ser Ser Ala Ser Leu Ser Glu Lys Ser Asn Val Val 145 150 155 160

Gln Thr Pro Val His Gln Met Gly Ser Val Ser Ser Leu Pro Ser Lys 165 170 175

Lys Asn Ser Met Gln Pro His Asn Thr Glu Met Met Val Arg Thr Ala 180 185 190

Ser Thr Gln Gln Ser Ile Lys Gly Asp Phe Gln Ala Val Leu Lys 195 200 205

Gln Gly Met Pro Thr Pro Ala Lys Val Met Pro Arg Val Asp Val Pro 210 215 220

Pro Ser Met Arg Ala Ser Lys Glu Arg Val Gly Leu Arg Pro Ala Glu 225 230 235 240

Met Leu Ala Asn Val Gly Pro Ser Pro Ser Lys Ala Lys Gln Ile Val 245 250 255

Asn Pro Ala Ala Ala Lys Val Thr Gln Arg Val Asp Pro Pro Pro Ala 260 265 270

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Glu Val Gln Pro Pro Ile Pro Lys Val Pro Val Ala Met Pro Thr Ile 305 310 315 320

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Lys Lys Arg Lys His Glu Asp Ile Asn Asn Ala Asp Gln Lys Ser Arg 65 70 75 80

Lys Val Ser Ser Met Glu Pro Gly Glu Gln Leu Glu Lys Ser Gly Leu 85 90 95

Ser Glu Glu His Gly Ala Pro Cys Phe Thr Gln Thr Val His Gly Ser 100 105 110

Pro Glu Ser Ser Gln Asp Ser Ser Lys Arg Arg Lys Val Val Leu Pro 115 120 125

Ser Pro Ser Gln Ala Lys Asn Gly Asn Ile Leu Arg Ile Lys Ile Arg 130 135 140

Arg Asp Gln Asp Ser Ser Ala Ser Leu Ser Glu Lys Ser Asn Val Val 145 150 155 160

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Pro Glu Ser Ser Gln Asp Ser Ser Lys Arg Arg Lys Val Val Leu Pro 115 120 125

Ser Pro Ser Gln Ala Lys Asn Gly Asn Ile Leu Arg Ile Lys Ile Arg 130 135 140

Arg Asp Gln Asp Ser Ser Ala Ser Leu Ser Glu Lys Ser Asn Val Val 145 150 155 160

Gln Thr Pro Val His Gln Met Gly Ser Val Ser Ser Leu Pro Ser Lys 165 170 175

Lys Asn Ser Met Gln Pro His Asn Thr Glu Met Met Val Arg Thr Ala 180 185 190

Ser Thr Gln Gln Ser Ile Lys Gly Asp Phe Gln Ala Val Leu Lys 195 200 205

Gln Gly Met Pro Thr Pro Ala Lys Val Met Pro Arg Val Asp Val Pro 210 215 220

Pro Ser Met Arg Ala Ser Lys Glu Arg Val Gly Leu Arg Pro Ala Glu 225 230 235 240

Met Leu Ala Asn Val Gly Pro Ser Pro Ser Lys Ala Lys Gln Ile Val 245 250 255

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Asp 385	Met	Asp	Leu	Gly	Asp 390	Gln	Asp	Trp	Leu	Leu 395	Gly	Ser	Thr	Arg	Lys 400	
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Asn Pro Ala Ala Ala Lys Val Thr Gln Arg Val Asp Pro Pro Pro Ala

Lys Ala Ser Gln Arg Ile Asp Pro Leu Leu Pro Ser Lys Val His Ile 

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Pro Gln Ser Ala Val Leu Glu Lys Pro Arg Val Leu Glu Gln Pro Leu 145 150 155 160

Val Gln Gln Met Gly Ser Gly Ser Ser Xaa Ser Gly Lys Gln Asn Ser 165 170 175

Ile His His Lys Met Asn Val Arg Ser Thr Ser Gly Gln Arg Arg Val 180 185 190

Asp Gly Asp Ser Gln Ala Val Gln Lys Cys Leu Ile Thr Glu Ser Pro 195 200 205

Ala Lys Thr Met Gln Arg Leu Val Pro Gln Pro Ala Ala Lys Val Thr 210 215 220

His Pro Val Asp Pro Gln Ser Ala Val Lys Val Pro Val Gly Arg Ser 225 230 235 240

Gly Leu Pro Leu Lys Ser Ser Gly Ser Val Asp Pro Ser Pro Ala Arg 245 250 255

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Val His His Pro Ala Ser Met Val Ser Gln Lys Val Asp Pro Pro Phe 275 280 285

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Ala Thr Arg Pro Thr Val Leu Gln Lys Pro Lys Asp Leu Pro Ala Ile 305 310 315 320

Lys Gln Gln Asp Ile Arg Thr Ser Ser Ser Lys Glu Glu Pro Cys Phe 325 330 335

Ser Gly Arg Asn Ala Glu Ala Val Gln Val Gln Asp Thr Lys Leu Ser

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Gly Ser Asp Leu Gly Asp Glu Asp Trp Leu Phe Ser Ser Lys Arg Asn 385 390 395 400

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Val	Ala Lys Gln	Val Ala 35 Cys	Ala 20 Glu Glu	5 Glu Lys Thr	Pro Lys Ser	Glu Lys Lys 55	Ser Glu 40 His	Thr 25 Lys Ser	10 Ala Arg Lys	Lys Ser His	Leu Asp Ser 60	Leu Arg 45 His	Lys 30 Lys	15 Glu Ala Lys	Lys Pro Arg	
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Gln Asp Ser Gly Lys Arg Arg Lys Val Val Leu Ser Ser Pro Ser Gln
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Pro Lys Asn Gly Asn Ile Leu Arg Phe Lys Ile Lys Ser Ser Gln Asp 130 135 140

Pro Gln Ser Ala Val Leu Glu Lys Pro Arg Val Leu Glu Gln Pro Leu 145 150 155 160

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Ile His His Lys Met Asn Val Arg Ser Thr Ser Gly Gln Arg Arg Val 180 185 190

Asn Gly Asp Ser Gln Ala Val Gln Lys Cys Leu Ile Thr Glu Ser Pro 195 200 205

Ala Lys Thr Met Gln Arg Leu Val Pro Gln Pro Ala Ala Lys Val Thr 210 215 220

His Pro Val Asp Pro Gln Ser Ala Val Lys Val Pro Val Gly Arg Ser 225 230 235 240

Gly Leu Pro Leu Lys Ser Ser Gly Ser Val Asp Pro Ser Pro Ala Arg 245 250 255

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Val His His Pro Ala Ser Met Val Ser Gln Lys Val Asp Pro Pro Phe 275 280 285

Pro Lys Val Leu His Lys Glu Thr Gly Ser Val Val Arg Leu Pro Glu 290 295 300

Ala Thr Arg Pro Thr Val Leu Gln Lys Pro Lys Asp Leu Pro Ala Ile 305 310 315 320

Lys Gln Gln Asp Ile Arg Thr Ser Ser Ser Lys Glu Glu Pro Cys Phe 325 330 335

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Ala					aga Arg											672
					cag Gln 230											720
					tct Ser											768
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							ttg Leu 380			1152
							agc Ser			1200
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1296

Ile His Pro Met Val Gln Gln Lys Pro Ser Leu Gln Pro Arg Ala Thr
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1344

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taa 1347

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Glu Lys Ala Glu Lys Lys Lys Glu Lys Arg Ser Asp Arg Lys Ala Pro 35 40 45

Lys Gln Cys Glu Thr Ser Lys His Ser Lys His Ser His Lys Lys Arg 50 55 60

Lys Leu Glu Asp Val Ile Lys Ala Glu Gln Gly Pro Lys Arg Val Pro 65 70 75 80

Lys Glu Ser Val Glu Gln Leu Glu Lys Ser Gly Leu Ser Glu Glu His 85 90 95

Gly Ala Pro Ser Phe Val His Thr Ile Arg Asp Ser Pro Glu Ser Ser 100 105 110

Gln Asp Ser Gly Lys Arg Arg Lys Val Val Leu Ser Ser Pro Ser Gln
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Pro Lys Asn Gly Asn Ile Leu Arg Phe Lys Ile Lys Ser Ser Gln Asp 130 135 140

Pro Gln Ser Ala Val Leu Glu Lys Pro Arg Val Leu Glu Gln Pro Leu 145 150 155 160

Val Gln Gln Met Gly Ser Gly Ser Ser Leu Ser Gly Lys Gln As<br/>n Ser 165 170 175

Ile His His Lys Met Asn Val Arg Ser Thr Ser Gly Gln Arg Arg Val 180 185 190

Asn Gly Asp Ser Gln Ala Val Gln Lys Cys Leu Ile Thr Glu Ser Pro 195 200 205

Ala Lys Thr Met Gln Arg Leu Val Pro Gln Pro Ala Ala Lys Val Thr 210 215 220

His Pro Val Asp Pro Gln Ser Ala Val Lys Val Pro Val Gly Arg Ser 225 230 235 240

Gly Leu Pro Leu Lys Ser Xaa Gly Ser Val Asp Pro Ser Pro Ala Arg 245 250 255

Val Met Arg Arg Phe Asp Pro Pro Pro Val Lys Met Met Ser Gln Arg 260 265 270

Val His His Pro Ala Ser Met Val Ser Gln Lys Val Asp Pro Pro Phe 275 280 285

Pro Lys Val Leu His Lys Glu Thr Gly Ser Val Val Arg Leu Pro Glu

STATE OF
C. Carrie
1
Concession of the Concession o
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Trail.
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2

ctaag

	290					295					300						
Ala 305	Thr	Arg	Pro	Thr	Val 310	Leu	Gln	Lys	Pro	Lys 315	Asp	Leu	Pro	Ala	Ile 320		
Lys	Gln	Gln	Asp	Ile 325	Arg	Thr	Ser	Ser	Ser 330	Lys	Glu	Glu	Pro	Cys 335	Phe		
Ser	Gly	Arg	Asn 340	Ala	Glu	Ala	Val	Gln 345	Val	Gln	Asp	Thr	Lys 350	Leu	Ser		
Arg	Ser	Asp 355	Met	Lys	Lys	Ile	Arg 360	Lys	Ala	Glu	Lys	Lys 365	Asp	Lys	Lys		
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Ile	His	Pro	Met 420	Val	Gln	Gln	Lys	Pro 425	Ser	Leu	Gln	Pro	Arg 430	Ala	Thr		
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	g cag s Gln 50															192
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	gaa Glu															288

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ccg Pro	aag Lys 290	gta Val	tta Leu	cat His	aag Lys	gaa Glu 295	acc Thr	gga Gly	tct Ser	gtt Val	gtt Val 300	cgc Arg	cta Leu	cca Pro	gaa Glu	912
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1056

350

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Lys Leu Glu Asp Val Ile Lys Ala Glu Gln Gly Pro Lys Arg Val Pro

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Pro Gln Ser Ala Val Leu Glu Lys Pro Arg Val Leu Glu Gln Pro Leu 145 150 155 160

Val Gln Gln Met Gly Ser Gly Ser Ser Leu Ser Gly Lys Gln Asn Ser 165 170 175

Ile His His Lys Met Asn Val Arg Ser Thr Ser Gly Gln Arg Arg Val 180 185 190

Asn Gly Asp Ser Gln Ala Val Gln Lys Cys Leu Ile Thr Glu Ser Pro 195 200 205

Ala Lys Thr Met Gln Arg Leu Val Pro Gln Pro Ala Ala Lys Val Thr 210 215 220

His Pro Val Asp Pro Gln Ser Ala Val Lys Val Pro Val Gly Arg Ser 225 230 235 240

Gly Leu Pro Leu Lys Ser Ser Gly Ser Val Asp Pro Ser Pro Ala Arg
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Pro Lys Val Leu His Lys Glu Thr Gly Ser Val Val Arg Leu Pro Glu 290 295 300

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Val His His Pro Ala Ser Met Val Ser Gln Lys Val Asp Pro Pro Phe 275 280 285

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73
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Pro Lys Val Leu His Lys Glu Thr Gly Ser Val Val Arg Leu Pro Glu

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gaa aag gcc gaa aag aag aaa gag aaa agg agt gac agg aaa gct ccc Glu Lys Ala Glu Lys Lys Lys Glu Lys Arg Ser Asp Arg Lys Ala Pro 35 40 45	144
and the total and the same the same the	192
aag cag tgt gag acg tcc aaa cat tca aag cac agc cat aag aag aga Lys Gln Cys Glu Thr Ser Lys His Ser Lys His Ser His Lys Lys Arg 50 55 60	
Lys Gln Cys Glu Thr Ser Lys His Ser Lys His Ser His Lys Lys Arg	240

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ccg Pro	aag Lys 290	gta Val	tta Leu	cat His	aag Lys	gaa Glu 295	acc Thr	gga Gly	tct Ser	gtt Val	gtt Val 300	cgc Arg	cta Leu	cca Pro	gaa Glu	912
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aag Lys	cag Gln	cag Gln	gat Asp	atc Ile	agg Arg	acc Thr	tct Ser	tcc Ser	tca Ser	aaa Lys	gaa Glu	gag Glu	ccc Pro	tgc Cys	ttc Phe	1008

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Zea mays mays strain W22

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Glu Lys Ala Glu Lys Lys Glu Lys Arg Ser Asp Arg Lys Ala Pro 35 40

Lys Gln Cys Glu Thr Ser Lys His Ser Lys His Ser His Lys Lys Arg 50 55

Lys Leu Glu Asp Val Ile Lys Ala Glu Gln Gly Pro Lys Arg Val Pro

The state of the s

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Gln Asp Ser Gly Lys Arg Arg Lys Val Val Leu Ser Ser Pro Ser Gln
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Pro Lys Asn Gly Asn Ile Leu Arg Phe Lys Ile Lys Ser Ser Gln Asp 130 135 140

Pro Gln Ser Ala Val Leu Glu Lys Pro Arg Val Leu Glu Gln Pro Leu 145 150 155 160

Val Gln Gln Met Gly Ser Gly Ser Ser Pro Ser Gly Lys Gln Asn Ser 165 170 175

Ile His His Lys Met Asn Val Arg Ser Thr Ser Gly Gln Arg Arg Val
180 185 190

Asp Gly Asp Ser Gln Ala Val Gln Lys Cys Leu Ile Thr Glu Ser Pro 195 200 205

Ala Lys Thr Met Gln Arg Leu Val Pro Gln Pro Ala Ala Lys Val Thr 210 215 220

His Pro Val Asp Pro Gln Ser Ala Val Lys Val Pro Val Gly Arg Ser 225 230 235 240

Gly Leu Pro Leu Lys Ser Ser Gly Ser Val Asp Pro Ser Pro Ala Arg
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Val Met Arg Arg Phe Asp Pro Pro Pro Val Lys Met Met Ser Gln Arg 260 265 270

Val His His Pro Ala Ser Met Val Ser Gln Lys Val Asp Pro Pro Phe 275 280 285

Pro Lys Val Leu His Lys Glu Thr Gly Ser Val Val Arg Leu Pro Glu 290 295 300

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Arg	Ser	Asp 355	Met	Lys	Lys	Ile	Arg 360	Lys	Ala	Glu	Lys	Lys 365	Asp	Lys	Lys	
Phe	Arg 370	Asp	Leu	Phe	Val	Thr 375	Trp	Asn	Pro	Val	Leu 380	Ile	Glu	Asn	Glu	
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Asn Gly Asp Ser Gln Ala Val Gln Lys Cys Leu Ile Thr Glu Ser Pro 195 200 205

Ala Lys Thr Met Gln Arg Leu Val Pro Gln Pro Ala Ala Lys Val Thr 210 215 220

His Pro Val Asp Pro Gln Ser Ala Val Lys Val Pro Val Gly Arg Ser 225 230 235 240

Gly Leu Pro Leu Lys Ser Ser Gly Ser Val Asp Pro Ser Pro Ala Arg 245 250 255

Val Met Arg Arg Phe Asp Pro Pro Pro Val Lys Met Met Ser Gln Arg 260 265 270

Val His His Pro Ala Ser Met Val Ser Gln Lys Val Asp Pro Pro Phe 275 280 285

Pro Lys Val Leu His Lys Glu Thr Gly Ser Val Val Arg Leu Pro Glu

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DNA

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Gln Asp Ser Gly Lys Arg Arg Lys Val Val Leu Ser Ser Pro Ser Gln 115 120 125

Pro Lys Asn Gly Asn Ile Leu Arg Phe Lys Ile Lys Ser Ser Gln Asp 130 135 140

Pro Gln Ser Ala Val Leu Glu Lys Pro Arg Val Leu Glu Gln Pro Leu 145 150 155 160

Val Gln Gln Met Gly Ser Gly Ser Ser Pro Ser Gly Lys Gln Asn Ser 165 170 175

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Asp Gly Asp Ser Gln Ala Val Gln Lys Cys Leu Ile Thr Glu Ser Pro
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Ala Lys Thr Met Gln Arg Leu Val Pro Gln Pro Ala Ala Lys Val Thr 210 215 220

His Pro Val Asp Pro Gln Ser Ala Val Lys Val Pro Val Gly Arg Ser 225 230 235 240

Gly Leu Pro Leu Lys Ser Ser Gly Ser Val Asp Pro Ser Pro Ala Arg 245 250 255

Val Met Arg Arg Phe Asp Pro Pro Pro Val Lys Met Met Ser Gln Arg 260 265 270

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<sup>&</sup>lt;213> Zea mays parviglumis strain IA19

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180 185 190

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<220> <221> misc feature (34)..(34)<222> <223> The 'Xaa' at location 34 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe. <220> <221> misc feature <222> (35)..(35)<223> The 'Xaa' at location 35 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe. <220> <221> misc feature <222> (36)..(36)<223> The 'Xaa' at location 36 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe. <220> <221> misc feature <222> (37)..(37)<223> The 'Xaa' at location 37 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe. <220> <221> misc feature <222> (38)..(38)<223> The 'Xaa' at location 38 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe. <220> <221> misc feature <222> (39)..(39)<223> The 'Xaa' at location 39 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe. <220> <221> misc feature <222> (40)..(40)<223> The 'Xaa' at location 40 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe. <220> <221> misc feature <222> (41)..(41)<223> The 'Xaa' at location 41 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

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        The 'Xaa' at location 47 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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       The 'Xaa' at location 324 stands for Glu, or Asp.
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- Val Ala Val Ala Glu Pro Glu Ser Thr Ala Lys Xaa Xaa Xaa Xaa Xaa 20 25 30
- Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Ser Lys His Ser His Lys Lys Arg 50 55 60
- Lys Leu Glu Asp Val Ile Lys Ala Glu Gln Val Pro Lys Arg Val Pro 65 70 75 80
- Lys Glu Ser Val Glu Gln Leu Glu Lys Ser Gly Leu Ser Glu Glu His
  85 90 95
- Gly Ala Pro Ser Phe Val His Thr Ile Arg Asp Ser Pro Glu Ser Ser 100 105 110
- Gln Asp Ser Gly Lys Arg Arg Lys Val Val Leu Ser Ser Pro Ser Gln
  115 120 125
- Pro Lys Asn Gly Asn Ile Leu Arg Phe Lys Ile Lys Ser Ser Gln Asp 130 135 140
- Pro Gln Ser Ala Val Leu Glu Lys Pro Arg Val Leu Glu Gln Pro Leu 145 150 155 160
- Val Gln Gln Met Gly Ser Gly Ser Ser Leu Ser Gly Lys Gln Asn Ser 165 170 175
- Ile His His Lys Met Asn Val Arg Ser Thr Ser Gly Gln Arg Arg Val 180 185 190
- Asn Gly Asp Ser Gln Ala Val Gln Lys Cys Leu Ile Thr Glu Ser Pro 195 200 205
- Ala Lys Thr Met Gln Arg Leu Val Pro Gln Pro Ala Ala Lys Val Thr 210 215 220

His Pro Val Asp Pro Gln Ser Ala Val Lys Val Pro Val Gly Arg Ser 225 230 235 240

Gly Leu Pro Leu Lys Ser Ser Gly Ser Val Asp Pro Ser Pro Ala Arg 245 250 255

Val Met Arg Arg Phe Asp Pro Pro Pro Val Lys Met Met Ser Gln Arg
260 265 270

Val His His Pro Ala Ser Met Val Ser Gln Lys Val Asp Pro Pro Phe 275 280 285

Pro Lys Val Leu His Lys Glu Thr Gly Ser Val Val Arg Leu Pro Glu 290 295 300

Ala Thr Arg Pro Thr Val Leu Gln Lys Pro Lys Asp Leu Pro Ala Ile 305 310 315 320

Lys Gln Gln Xaa Ile Arg Thr Ser Ser Ser Lys Glu Glu Pro Cys Phe 325 330 335

Ser Gly Arg Asn Ala Glu Ala Val Gln Val Gln Asp Thr Lys Leu Ser 340 345 350

Arg Ser Asp Met Lys Lys Ile Arg Lys Ala Glu Lys Lys Asp Lys Lys 355 360 365

Phe Arg Asp Leu Phe Val Thr Trp Asn Pro Val Leu Ile Glu Asn Glu 370 375 380

Gly Ser Asp Leu Gly Asp Glu Asp Trp Leu Phe Ser Ser Lys Arg Asn 385 390 395 400

Ser Asp Ala Ile Met Val Gln Ser Arg Ala Thr Asp Ser Ser Val Pro
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Phe Leu Pro Asp Leu Asn Met Tyr Gln Leu Pro Tyr 435 440

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 Val Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Leu Leu Lys Glu Lys
 gaa aag gcc gaa aag aaa gag aaa agg agt gac agg aaa gct ccc
                                                                   144
 Glu Lys Ala Glu Lys Lys Glu Lys Arg Ser Asp Arg Lys Ala Pro
 aag cag tgt gag acg tcc aaa cat tca aag cac agc cat aag aag aga
                                                                   192
 Lys Gln Cys Glu Thr Ser Lys His Ser Lys His Ser His Lys Lys Arg
 aag ctt gaa gat gtc atc aaa gct gag cag ggt ccc aaa aga gta ccc
                                                                   240
Lys Leu Glu Asp Val Ile Lys Ala Glu Gln Gly Pro Lys Arg Val Pro
                    70
                                                          80
aaa gaa tca gtt gag cag ttg gag aag agt gga ctc tca gaa gag cat
                                                                   288
Lys Glu Ser Val Glu Gln Leu Glu Lys Ser Gly Leu Ser Glu Glu His
                85
gga gct cct tct ttt gta cat acg ata cgt gac tct cct gag agc tca
                                                                  336
Gly Ala Pro Ser Phe Val His Thr Ile Arg Asp Ser Pro Glu Ser Ser
            100
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cct Pro	aag Lys 130	aat Asn	gga Gly	aac Asn	att Ile	ctt Leu 135	cgc Arg	ttc Phe	aag Lys	att Ile	aaa Lys 140	agt Ser	agt Ser	caa Gln	gat Asp	432	
ccc Pro 145	caa Gln	tca Ser	gct Ala	gtt Val	ctg Leu 150	gag Glu	aaa Lys	cca Pro	agg Arg	gtt Val 155	ctt Leu	gag Glu	caa Gln	cca Pro	ttg Leu 160	480	
						ggt Gly										528	
Ile	His	His	Lys 180	Met	Asn	gtg Val	Arg	Ser 185	Thr	Ser	Gly	Gln	Arg 190	Arg	Val	576	
Asn	Gly	Asp 195	Ser	Gln	Ala	gta Val	Gln 200	Lys	Cys	Leu	Ile	Thr 205	Glu	Ser	Pro	624	
Ala	Lys 210	Thr	Met	Gln	Arg	ctt Leu 215	Val	Pro	Gln	Pro	Ala 220	Ala	Lys	Val	Thr	672	
His 225	Pro	Val	Asp	Pro	Gln 230	tca Ser	Ala	Val	Lys	Val 235	Pro	Val	Gly	Arg	Ser 240	720	
Gly	Leu	Pro	Leu	Lys 245	Ser	tcg Ser	Gly	Ser	Val 250	Asp	Pro	Ser	Pro	Ala 255	Arg	768	
Val	Met	Arg	Arg 260	Phe	Asp	cct Pro	Pro	Pro 265	Val	Lys	Met	Met	Ser 270	Gln	Arg	816	
Val	His	His 275	Pro	Ala	Ser	atg Met	Val 280	Ser	Gln	Lys	Val	Asp 285	Pro	Pro	Phe	864	
Pro	Lys 290	Val	Leu	His	Lys	295	Thr	Gly	Ser	Val	Val 300	Arg	Leu	Pro	Glu	912	
gct Ala 305	Thr	Arg	Pro	Thr	Val 310	Leu	Gln	Lys	Pro	Lys 315	Asp	Leu	Pro	Ala	Ile 320	960	
aag Lys	Gln	Gln	Asp	Ile 325	Arg	Thr	Ser	Ser	Ser 330	Lys	Glu	Glu	Pro	Cys 335	Phe	1008	
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                                                                      1104
Arg Ser Asp Met Lys Lys Ile Arg Lys Ala Glu Lys Lys Asp Lys Lys
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                             360
ttc aga gat ctg ttt gtt acc tgg aat ccg gta ttg ata gag aat gaa
                                                                      1152
Phe Arg Asp Leu Phe Val Thr Trp Asn Pro Val Leu Ile Glu Asn Glu
    370
                         375
ggt tca gat ctt ggt gat gaa gac tgg ctg ttc agc agt aaa agg aac
                                                                      1200
Gly Ser Asp Leu Gly Asp Glu Asp Trp Leu Phe Ser Ser Lys Arg Asn
tee gat get ate atg gtt caa age aga get act gat agt tea gtg eeg
                                                                      1248
Ser Asp Ala Ile Met Val Gln Ser Arg Ala Thr Asp Ser Ser Val Pro
atc cat cca atg gtg cag cag aag cct tct tta caa ccc agg gca aca
                                                                      1296
Ile His Pro Met Val Gln Gln Lys Pro Ser Leu Gln Pro Arg Ala Thr
            420
                                 425
ttt ttg ccg gac ctt aat atg tac cag ctg cca tat gtc gta cca ttt
                                                                      1344
Phe Leu Pro Asp Leu Asn Met Tyr Gln Leu Pro Tyr Val Val Pro Phe
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taa
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       The 'Xaa' at location 20 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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       Tyr, Trp, Cys, or Phe.
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<223>
       The 'Xaa' at location 21 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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       (22)..(22)
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       The 'Xaa' at location 22 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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       The 'Xaa' at location 23 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Glu Lys Ala Glu Lys Lys Lys Glu Lys Arg Ser Asp Arg Lys Ala Pro 35 40 45

Lys Gln Cys Glu Thr Ser Lys His Ser Lys His Ser His Lys Lys Arg 50 55 60

Lys Leu Glu Asp Val Ile Lys Ala Glu Gln Gly Pro Lys Arg Val Pro 65 70 75 80

Lys Glu Ser Val Glu Gln Leu Glu Lys Ser Gly Leu Ser Glu Glu His 85 90 95

Gly Ala Pro Ser Phe Val His Thr Ile Arg Asp Ser Pro Glu Ser Ser 100 105 110

Gln Asp Ser Gly Lys Arg Arg Lys Val Val Leu Ser Ser Pro Ser Gln 115 120 125

Pro Lys Asn Gly Asn Ile Leu Arg Phe Lys Ile Lys Ser Ser Gln Asp 130 135 140

Pro Gln Ser Ala Val Leu Glu Lys Pro Arg Val Leu Glu Gln Pro Leu 145 150 155 160

Val Gln Gln Met Gly Ser Gly Ser Ser Leu Ser Gly Lys Gln Asn Ser 165 170 175

Ile His His Lys Met Asn Val Arg Ser Thr Ser Gly Gln Arg Arg Val
180 185 190

Asn Gly Asp Ser Gln Ala Val Gln Lys Cys Leu Ile Thr Glu Ser Pro 195 200 205

Ala Lys Thr Met Gln Arg Leu Val Pro Gln Pro Ala Ala Lys Val Thr 210 215 220

His Pro Val Asp Pro Gln Ser Ala Val Lys Val Pro Val Gly Arg Ser 225 230 235 240

Gly Leu Pro Leu Lys Ser Ser Gly Ser Val Asp Pro Ser Pro Ala Arg 250 Val Met Arg Arg Phe Asp Pro Pro Pro Val Lys Met Met Ser Gln Arg 260 265 Val His His Pro Ala Ser Met Val Ser Gln Lys Val Asp Pro Pro Phe 275 280 Pro Lys Val Leu His Lys Glu Thr Gly Ser Val Val Arg Leu Pro Glu 290 295 Ala Thr Arg Pro Thr Val Leu Gln Lys Pro Lys Asp Leu Pro Ala Ile 305 315 Lys Gln Gln Asp Ile Arg Thr Ser Ser Ser Lys Glu Glu Pro Cys Phe 325 330 Ser Gly Arg Asn Ala Glu Ala Val Gln Val Gln Asp Thr Lys Leu Ser 340 345 Arg Ser Asp Met Lys Lys Ile Arg Lys Ala Glu Lys Lys Asp Lys Lys 355 360 Phe Arg Asp Leu Phe Val Thr Trp Asn Pro Val Leu Ile Glu Asn Glu 370 375 Gly Ser Asp Leu Gly Asp Glu Asp Trp Leu Phe Ser Ser Lys Arg Asn 385 390 400 Ser Asp Ala Ile Met Val Gln Ser Arg Ala Thr Asp Ser Ser Val Pro 405 410 415 Ile His Pro Met Val Gln Gln Lys Pro Ser Leu Gln Pro Arg Ala Thr

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